

REMARKS

This is in response to the Office Action dated December 12, 2003. Claims 7 and 16 have been canceled. Thus, claims 1-6 and 8-15 are now pending.

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Medwick in view of Veerasamy. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "ion beam depositing, using gas comprising a hydrocarbon, a protective layer comprising diamond-like carbon (DLC) on the glass substrate over the coating so as to directly contact the coating; heat treating the glass substrate with the coating and protective layer thereon so that the protective layer comprising diamond-like carbon (DLC) at least partially burns off during the heat treating." It has surprisingly been found that the use of ion beam deposition for the DLC, with gas comprising a hydrocarbon such as C₂H₂ in the ion source, is highly advantageous in that it results in much less damage, if any, to the underlying coating. This permits the DLC to be applied directly to the coating with no barrier or other layer provided therebetween, thereby enabling processing steps to be saved compared to the cited art. The cited art fails to disclose or suggest this aspect of claim 1.

Medwick relates primarily to the use of a polymer protective coating that is removed by washing (e.g., paragraph [0031]). However, Medwick also mentions a carbon protective coating that may be removed by combustion (e.g., paragraph [0055]). Medwick's carbon coating is applied via MSVD or carbon arc deposition (both entirely

unrelated to ion beam deposition as called for in claim 1) (e.g., see paragraph [0055]).

Because of these techniques used by Medwick, a barrier or blocking layer 18 must be provided under the carbon to prevent damage to the functional coating (e.g., see paragraph [0056]). This is, or course, undesirable in that extra processing and layer(s) are needed, thereby significantly increasing the cost of manufacture and decreasing yields.

In contrast, by using ion beam deposition with a gas comprising hydrocarbon, the instant inventors have found that much less damage is done to the underlying coating. Thus, the DLC can be deposited in a more efficient manner directly onto the coating with no need for a blocking layer that is needed in Medwick.

Medwick clearly fails to disclose or suggest the following aspects of claim 1: (1) ion beam deposition; (2) use of hydrocarbon gas in ion beam deposition; and (3) use of DLC in the protective layer. Moreover, it has been explained above that these requirements of claim 1 lead to unexpected results which represent significant improvements in the art. Thus, it is respectfully submitted that even any *prima facie* case of obviousness has been rebutted and should be withdrawn.

The Office Action cites Veerasamy for the use of DLC. However, Veerasamy teaches directly away from the invention of claim 1 because the entire goal of Veerasamy is to *prevent* the DLC from burning off by using a tungsten disulfide layer located over the DLC. Veerasamy expressly states that the DLC should not be permitted to burn off during heat treatment. Thus, Veerasamy clearly teaches directly away from the invention

of claim 1, and also teaches directly away from the object of Medwick which is to remove carbon. Moreover, one of ordinary skill in the art would never have combined Veerasamy and Medwick as alleged in the Office Action because Veerasamy expressly states that the DLC should be prevented from burning off during heat treatment (this is the opposite of what claim 1 requires, and the opposite of what Medwick desires). Thus, the references are not even properly combinable.

Claim 13 requires "ion beam depositing a protective layer comprising diamond-like carbon (DLC) on the glass substrate directly over and contacting the coating, wherein an ion source having hydrocarbon gas therein is used in said ion beam depositing of the protective layer comprising DLC; heat treating the substrate with the coating and protective layer thereon at a temperature of at least 570 degrees C so that the protective layer comprising diamond-like carbon (DLC) at least partially burns off." As explained above, the cited art fails to disclose or suggest these aspects of claim 13.

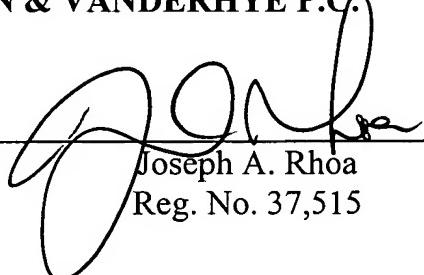
For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

THOMSEN et al.
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Respectfully submitted,

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